Making the macroeconomic case for CCS?

Karen Turner

(Centre for Energy Policy, University of Strathclyde International Public Policy Institute)

Julia Race

(Department of Naval Architecture, Ocean and Marine Engineering, University of Strathclyde)

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The need to adopt a wider policy perspective

- CCS would be a 'game changer', but generally thought of as an extremely costly one
- But society makes big investments all the time
- How can we make it happen? Understanding of wider public policy and politicians perhaps the crucial challenge
- A new way of thinking…..multiple benefits? IEA and energy efficiency
- Not that new? Not just recognising policy trade offs anymore….

‘Multiple benefits’ thinking

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Harnessing the industrial opportunities from new energy technologies

In nuclear, the decision to proceed with the first new nuclear power station in a generation at Hinkley Point is accompanied by a commitment to develop a strong UK supply chain to support the sector, with EDF expecting over 60 per cent of the project’s construction value to be placed with UK companies. In turn investment in nuclear skills – at college and university level – is upgrading both the domestic capacity to provide the labour required and the level of skills and income in the local workforce.

The pillars

7. **Delivering affordable energy and clean growth –** we need to keep costs down for businesses, and secure the economic benefits of the transition to a low-carbon economy.

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Not just about the potential for benefits

The challenge

There are three major challenges for energy policy that our industrial strategy will address.

First, to ensure that the shift to a low carbon economy is done in a way that minimises the cost to UK businesses, taxpayers and consumers.

The Role of Economical-Technical System Modelling in Considering the Value of CCS

Karen Turner[1] and Julia Race[2]
[1]Centre for Energy Policy, University of Strathclyde International Public Policy Institute
[2]Department of Naval Architecture, Ocean and Marine Engineering, University of Strathclyde

> "HM Treasury raised concerns about the merits of the carbon capture and storage competition given fiscal constraints"
> 'Briefing for the House of CommonsEnvironmental Audit Committee' by the National Audit Office, July 2016 (page 7)

Analysis:

It is considered that this decision was reached because there were key omissions in the information provided to Treasury:

- The wider economic and fiscal case not made
- The near-term benefits were not argued *e.g.* employment in developing infrastructure
- The longer term benefits of establishing an economic service activity not considered

How can we do this:

- Need to consider case for CCS via *social* cost benefit analysis
- Need to include carbon capture, transport and storage as economic service activities
- Need to inform wider economy models with techno-economic data of the CCS system

CCS as a set of linked economic service activities

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- Early multi-sector economy-wide input-output analysis considering pollution 'cleaning' as an economic service sector (Nobel Laureate, Wassily Leontief, 1970)
- Useful analogy in waste disposal – an industry exists, with infrastructure in place, operational activity (including employment)
- Why did we decide to deal with waste? Why would we decide to deal with CO2?
- Local vs. global health issues and timeframes involved
- Economic case will have to be stronger?

Transport and storage

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- Is there a national infrastructure argument in considering transport and storage? Potentially extending to a commercial one if we can export services?
- Problem – cost of initial investment and responsibility for ensuring maintained and run efficiently and effectively
- Many analogies in terms of cost, often set in the context of natural monopoly
- We generally recognise that average cost will decline over time and accept initial financial and other resource costs

Developing a narrative

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- Policy analysis of infrastructure projects would generally be informed by cost-benefit analysis (CBA)
- *Social* cost-benefit context - informed by economy-wide analysis and clear 'Green Book' criteria followed
- Why not with CCS?
- Problem – no consideration as set of linked ***economic activities***
- Indeed, infrastructure development is an economic activity, as is the resulting service provision

Bringing in capture

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- Capture will also involve initial investment by firms
- But with nature and cost dependent on link to transport network
- Generally, over time both average and marginal ***costs*** of the element of the CCS system and their integration are likely to ***decline*** through
  - Advances and evolution in technologies
  - Learning by doing
  - Economies of scale with fuller deployment
  - Linking to other potentially costly 'game changers', such as hydrogen, but linking to enable and promote these solutions

Key selling points of CCS as a set of linked and evolving economic service activities

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- Simultaneously, ***benefits will evolve*** through
  - Ripple or multiplier effects of employment and value-added generated through supply chains at investment and operational stages
  - Retention of existing but currently carbon-intensive industries – and employment etc. embedded in supply chains of those industries
    - And possibly attraction of new firms attracted by CCS infrastructure and cluster opportunities
  - 'Circular economy' opportunities where captured carbon can be used as an input to economic activity
    - Previous SCCS Joint Industry Project

Developing economic multipliers for CO_2–EOR activity

Professor Karen Turner – University of Strathclyde

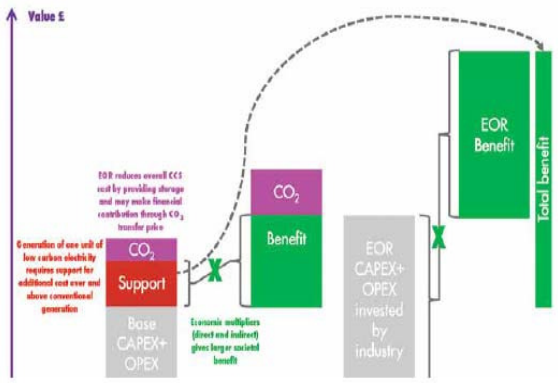

Figure 11: Capturing the impact of CO_2–EOR activity using multipliers

Social cost-benefit analysis

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- HM Treasury 'Green Book' method and guidance for social CBA of range of types of projects and investments
- Including 'environmental' or climate change mitigation projects
- Need information to inform on range of wider costs and benefits
- HM Treasury use multi-sector economy-wide CGE model
  - To date, limited energy or environmental policy applications
  - Current attention to need to develop this CGE model to incorporate better treatment of energy and environmental issues
- Key point: fiscal, macroeconomic and distributional impacts remain key in public budget decisions

Conclusion: much of the problem is about developing the narrative

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- What can CCS (and/or component elements) offer in terms of multiple benefits?
- At local area levels (persuading public)?
- And wider Scotland/UK (persuading Scottish/UK govt.)?
- Making the fiscal case?
- Dealing with the upfront costs/investment hurdles in terms of a wider set of future discounted benefits
- Identifying potential sources of benefits that are important to policy makers ***now***
- Communication using HMT Green Book 'language'
- Involving consideration the in context of economy-wide modelling? (UK Parliament Enquiry on 'HMT and Sustainability')

Caution….but also opportunity

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- Not guaranteed that such an analysis would deliver a ‘yes’ to CCS
- But it would help us think about how things would have to develop to move in the right direction
- Therefore, conducting full policy-focussed analysis cannot be an add-on, something we get to later
- It has to proceed alongside the technological and ‘project economics’ work